PART III

THREATS, MAINTENANCE AND PRESERVATION

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3.1 Threats to the Temple structures

The ICOMOS categorizes the following as threats to heritage site sin its analysis of 'Threats to World Heritage Sites, 1994-2004' published in MAY 2005.

Categorization of threats: The 8 main categories: A. Deterioration B. Development C. Extraction of resources D. Large-scale development projects (e.g. energy-transport) E. Tourism F. Local on-site Management deficiencies G. Cultural changes of deficiencies H. General context-National level

The threats due to Deterioration and decay in the structure of the temple are discussed in the earlier sections. Besides structural and material distresses there are a various threats to be considered while dealing with the temples structures, these are discussed as follows:

3.1.1 Pressure from Urban Growth and Development:

Most of the temple complexes are found in the midst of dense urban or rural settlements. Several temples are located at the centre of the city and the settlement is planned around the temple. Issues such as encroachments in and around parts of the temple complex, modern structures built adjacent to the temple structures can pose a serious threat to both the visual appeal as well as the structural stability of the temple structures. The ritual practices of the temples that include the streets surrounding the temples (mada veethi), temple tanks, etc are also affected by urban growth, reduction of road size and encroachments. The traditional system of water supply to the temple tanks from the watershed areas are affected due to the vast urban development in the watershed areas.

3.1.2 Large scale development projects:

Large scale development projects such as subterranean transit system, multi-storey constructions that involve pile foundations, quarrying and other projects at close proximity to the temples must be considered as potential threats and an Heritage Impact Assessment (HIA) must be done prior to commencing such projects in close proximity to

the temples of high historic importance. Laying of new Highways, bridges and other infrastructural facilities must also undergo an Heritage Impact Assessment and proposals must be made in such a way as to protect the heritage structures.

3.1.3 Patronage and subsequent additions and expansions of the temple complex:

The concept of expansion of the temple, due to additions in the temple complex has been in practice since the time of royal patronage. This kind of patronage has immensely contributed to the evolution to the South Indian Temple Complex. While the agamas mentions that the temples of 'puradhana' divine significance (refer B 2.8) must be retained in the same way they were built, the process of renovation or additions in other temples is not condemned. While several renovation work are carried out in temples of recent origin, In case of Puradhana temple and temples with historic, artistic or architectural value, no additions or renovations shall be made.

3.1.4 Lack of awareness of heritage values

Stapatis and engineers involved in the conservation or renovation in the temples must be sensitized to the principles and values of conservation practice. Awareness of the heritage value of the structures and the importance of preserving the cultural heritage among all stake holders is the key to a successful collaboration.

3.1.5 Lack of expertise for conservation and preservation of temples

Renovations and alterations in the temple structures shall not be carried out by untrained workforce. Suitable workshops and training programs will be planned and conducted by the department as well as the State Department of Archaeology. The large number of temples under the HR&CE makes it difficult to devise an expert panel for minor decisions, for this a conservation wing under the HR&CE Department consisting of professionally trained and experienced in heritage conservation will be proposed.

3.1.6 Threats to due to continuous use

The temples are strained to accommodate a huge number of people due to the fixed dimensions of the temple and the growing population especially during religious festivals and ceremonies. Hence certain measures for crowd control are prerogative in order to ensure the safety of the users. These interventions and barriers must be temporary in nature and must not affect the temple structure. The hand rails, fences and barriers must never be connected to the columns, walls or any structural member of the temple structure.

Continuous religious use also results in damage to the interior surfaces of the temples from soot from oil lamps, dust and settlement of religious offerings such as vibuthi, kumkum and burning camphor in enclosed environments can have a negative effect on the mural paintings and sculptures.

3.1.7 Threats to movable heritage and collections

The temple has associated with it artifacts and artistic expressions, such as iconography, mural paintings and inscriptions. Poor maintenance, inadequate cataloguing of these documentary evidence relating to the heritage values may lead to their deterioration. The identification of historically important murals and inscriptions, bronzes (utsava vigraha) and their proper documentation and cataloguing can help conserve the content of these collections for posterity.

3.2 Principles of Maintenance and repair work:

The objective of maintenance is to preserve the structure so as to secure its uninterrupted use. Maintenance and management not only keeps up the physical condition of a building but also provides a safe environment for the user and retain the significance and function of the temples.

Good maintenance and management can prevent a great deal of damage and decay of the structures, hence maintenance work should be carried out with forethought, control and use of records based on a historic building inspection and condition survey.

3.2.2 Assessing the Repair

Whenever any distress is noticed, there must be a clear understanding about the purpose of any maintenance and repair work to be carried out. The amount of repair should be kept to the minimum as the main intention is to slow the decaying process of the structure. Extra caution must be taken in order not to alter the features of the historic construction or unnecessarily disturb the historic fabric. The major aim is to ensure the strength of the structure is able to withstand the test of time.

3.2.3 Avoiding Unnecessary Damage

No repair should be carried out in excess of what is absolutely necessary, as much as we like to preserve a historic structure, any unnecessary alteration or replacement will be rendered useless if the changes made were very obvious. For a start, the replacement of historic fabric no matter how detail it is will have an adverse effect on the building appearances and diminish the authenticity thus reducing its value.

3.2.4 Analyzing Historic Development

Before commencement of repair or maintenance work in temples it is important to investigate or review the historical information about the structure. Usually the main criteria to look into are archaeological and architectural investigation, any record of particular structure and assessment on its historic context. The understanding of the period of construction, style of construction, etc. can help arrive at an insightful method of repair or restoration which should be done, by consultation with experts in the field..

3.2.5 Analyzing the Causes of Defects

A deep analysis on the structure's historical development, detail in design of repairs and should be preceded by long term observation. This must include the condition of its material, causes and processes of the rates of decay. Without the investigation above the same problem will find a way to repeat itself. This should also be analysed with expert's opinion.

3.2.6 Adopting Proven Techniques

Any repair that is going to take place must match or be compatible with existing material or methods of construction. This will preserve the historic value and integrity to ensure the work done has an appropriate life. If the existing material or element failed, then exception should take place rather than neglect of maintenance because it has completed its life cycle. New methods or techniques shouldn't be used unless the old techniques are no longer relevant. The techniques should be adopted in consultation with conservation experts as well as experienced stapathi. This process has to be approved by appropriate authority.

3.2.7. Preserving Originality

All repairs should be executed true to its original nature as possible. Minimum work is sufficient to ensure minimum obstruction to its original built and design.

3.2.8 Restoration of Lost Features

Stucco work, terracotta mouldings, sculptural relief work and members of timber frames may have been lost in the past. From record we could put these items back in place in the course of repair. These features can be replaced if there is sufficient data and evidence available for an accurate replacement in consultation with experts and sanction of appropriate authority.

3.2.9 Removal of Damaging Alterations

Any renovations, alterations or additions including remedial work done on the temple premises are important and to be recorded as a cumulative history of the building. Although these alterations might affect the aesthetic value of the building, the full consideration must be made in advance as to balance up the potential architectural gain and loss of historic integrity.

In places where there is significant damage to the heritage value of the temples due to improper alterations, these must be removed and the structure must be restored back to its original state in consultation with experts and sanction of appropriate authority.

Before

After

Arulmigu Aranganathaswamy Temple, Srirangam

Figure 1Removal of damaging alterations

Before

After

Figure 2Unearthing of plinth and architectural features that are submerged under sand

Before

After

Figure 3 Removal of non-traditional coating of paint from architectural features.

3.2.10 Safeguarding the Future

Monthly and annual maintenance must be done to ensure continued use of the temples and to safeguard the structure for the future.

3.3 MAINTENANCE PROTOCOLS

- ***Monthly maintenance protocols (visual observation)***

On basis of visual inspection, the conditions of the structure such as weathering, development of cracks, attack by biological factors, etc can be ascertained. Attending to this minor repair and removing the cause of damage can safe guard the structure.

Small-scale repairs, like the clearance of vegetation, re-setting of loose stones, pointing and filling in the crevices, removal of sand from the compound, application of paper pulp to remove salts due to efflorescence or in temples near coastal areas, should be done periodically as per procedures laid down by the trustee with trained staff employed for this purpose.

- ***Annual detailed maintenance protocol (structural)***

The structural stability of the building is of utmost importance. The maintenance works, such as the repair of roofs and wall tops should be given the highest priority. it is not sufficient to merely replace it, but the reasons for structural failure must be sought and analysed, and the cause of failure may be removed. The engineers and stapathis should regularly set up inspections, to check and follow up on the detailed maintenance protocols.

- ***Use of structural health monitoring tools***

Structural Health Monitoring tools (discussed in the conservation manual part 1 section 2.1) facilitate monitoring changes to the material and/or geometric properties of the structural system of the temples, including changes to the boundary conditions and system connectivity, which adversely affect the structure's performance should be adopted periodically.

- ***Vegetation removal***

Vegetation can be removed physically by uprooting them at the initial stages of developments; fully grown plants must be cut down. However, this does not prove to be an effective method as the plants tend to re grow. Chemical treatments with herbicides provide a better solution to control vegetation growth. Destroying tree roots and vegetation, through chemical treatment calls for a bi-annual treatment. Moss and lichen found on the surfaces can be chemically treated. This activity should be recorded and carried out regularly; all inspecting officers should inspect and report on this activity to appropriate authority.

Regular cleaning of the temple structure, repair of cracks and cavities, and controlling the dampness in the structure through water proofing can prevent vegetation growth.

- ***Rainwater drainage (cleaning of rainwater down-take pipes)***

Water penetration can be a potential threat for the temple structures. Periodic cleaning of rainwater down pipes and proper storm water drainage should be doneto prevent further decay in the structure.

- ***Rainwater drainage from sites (plinth protection)***

Temples that are at a lower level because of elevation in the surrounding areas should be dealt in such a way that there is an effective system of drainage without affecting the temple structure, its plinth or the surrounding features of architectural or historic importance.

Generally the temples have an arrangement of rain water drainage system or drainage to evacuate water used in religious ceremony. These traditional systems need to be maintained properly by periodic cleaning and removal of debris.

Proper rainwater drainage from the site and proper water proofing of the sub-structure must be done.

- ***Positioning of modern services and equipment:***

Care must be taken that the placement of overhead water tanks does not affect the temple structure. These may be placed on newer constructions instead of the historic structure.

- ***Overloading existing structure:***

Additional props must not be added to the temple superstructure or wall surfaces during festivals without approval. The structural safety must be considered before addition on any temporary props.

- ***Safe guarding murals and inscriptions***

Murals, inscriptions of high historic and artistic value must be identified, documented and maintained.

Wall paintings are an integral part of temples and sites and should be preserved in situ. Many of the problems affecting wall paintings are linked to the poor condition of the building or structure, its improper use, lack of maintenance, frequent repairs and alterations.

Any repair work around parts of the structure that has artistic (murals) or inscriptional value must be dealt with caution. Vibrations due to repair work or water penetration can easily degenerate the murals of artistic value.

Sandblasting is banned

Sandblasting is banned for cleaning accretions on the surfaces of pillar, walls and roofs. Water wash of a mild variety with little pressure should be done periodically. This must be carried in such a way that it doesn't affect the built fabric, after obtaining approval form appropriate authority. Study and diagnosis of

the strength the surface material must be undertaken before any commencement of the cleaning work.

- ***Hiring of contractors:***

Traditionally constructed temples do not perform in the same way as modern ones and need to be treated differently, at every stage of their conservation and repair.

Consultants and contractors who specialize in historic building work should be employed for maintenance work. The department's policy prescribes that a recognized sthapathi must be engaged in any non-secular work. To this effect, provision will be made for adopting special rates for the conservation /Stapathi works while preparing the estimates.

3.3. MURALS, SCULPTURES AND INSCRIPTIONS

3.3.1 Conservation Of Murals: Mural paintings in Temples of Tamil Nadu:

The mural paintings of Tamil Nadu have a long, rich and continuous tradition, ranging from the Pallava period to the Nayaka period. It was during the Vijayanagar and Nayaka periods that the art of painting in temples in Tamil Nadu flourished. Most of the murals in the State belong to the Vijayanagar and Nayaka periods. A few belong to the Maratha period of the 18th century.

Technique[i]:

The technique and process of making Indian wall paintings has been discussed in a special chapter of the Vishnudharamotaram, a Sanskrit text of the 5th/6th century A.D. The process of these paintings appears to have been the same in all the

early examples that have survived with an only exception in the Rajarajeshwara temple at Tanjore which is supposed to be done in a true fresco method over the surface of the rock.

Most of the colours were locally available. Brushes were made up from the hair of animals, such as goat, camel, mongoose, etc.

The ground was coated with an exceedingly thin layer of lime plaster over which paintings were drawn in water colours. In true fresco method the paintings are done when the surface wall is still wet so that the pigments go deep inside the wall surface. Whereas the other method of painting which was followed in most of the cases of Indian painting is known as tempora or fresco-secco. It is a method of painting on the lime plastered surface which has been allowed to dry first and then drenched with fresh lime water. On the surface thus obtained the artist proceeded to sketch out his composition. This first sketch was drawn by an experienced hand and subsequently corrected in many places with a strong black or deep brown line when the final drawing was added. After the painter had drawn out his first scheme in red, he proceeded to apply on this a semi-transparent terra verte monochrome, through which his outline could be seen. Over this preliminary glaze the artist worked in his local colours. Colors (predominantly red, yellow and white, black, and green) used in these paintings are of mineral origin and the ground is lime plaster.

<u>Deterioration of Murals:</u>

The murals are painted on the plastered surface over the granite slabs. The major cause of deterioration can be attributed to this arrangement. The factors causing deterioration are:

- defects in the structure causing defects on the surface of the murals
- losses in ceiling painting due to ingress of rain water through the gaps within the joints of stone structure
- deposition of soot from lamps
- deposition of dust, dirt, cement, etc due to human interference

- biological agents such as moss, fungus, algae , etc
- Climatic factors, cracked ceilings allow water and sunlight to seep in and spoil the murals leading to water stain developed over the surface of the paintings and development of salt deposits over the surface of the painting.
- improper interventions such as painting over the murals or restoring the ancient murals using modern paints, etc

Restoration and preservation of Murals:

Prior to any restoration work, the paintings have to be carefully examined and conservation problems are to be identified. Before commencing the work on preservation of murals an examination of the temple structure and factors causing the damage should be assessed and corrected. Before any preservation work, the temple has to be structurally stabilized, so that any work requiring scaffolding does not affect the structural stability. The process of restoration before and after the restoration work must be well documented through hi-resolution photographs.

The conservation work undertaken should involve cleaning, soot removal, removal of microbial growth, consolidation of both the ground (lime plaster) and pigment layers, reattachment of the loosened plaster and reintegration.

Principle of minimum intervention must be followed during conservation of paintings. The layers of paintings must be consolidated to strengthen the life of the paintings.

The Preservation and restoration work must be carried by experts with specialized knowledge about these kinds of frescoes. They have to be carefully treated in such a way that no further damage will take place. The estimates for this work should be prepared in consultation with expert panel approved by the government. the work should be executed only under the direct supervision of any one of the experts in the panel.

Process of Preservation:

- *Erection, dismantling and re-erection of scaffolding at different stages or work.*
- *removal of superficial accretions using soft bristled brushes*
- *removal of surface moisture using compress technique*
- *removal of white patches of salt deposits*
- *chemical treatment for the removal of adherent deposits using organic solvents and reagents*
- *consolidation of painted plaster*
- *repair of bulged plaster and detachment*
- *colour re-integration or loss of pigments*
- *'strengthening of pulverized and disintegrated plaster using consolidants*
- *total re-integration of lost painting scheme if recommended*
- *preservation of treated paintings with preservative*
- *The scribbling and deep furrowed writings are to be filled with fine lime paste and after drying they should be suitable tinted so as to match with the surrounding.*

3.3.2 Bronze Sculptures:

The temples are repository of a large number of bronzes of unique nature. The history of metal art in South India is of great antiquity, and this is a living art to this day. This is kept alive by ingenious craftsmen who have preserved the ancient texts about the method of preparation, and also the contemplative hymns or "Dhyana Slokas" which describe the forms of individual icons. The utsava vigrhas in several temples have high historic value and need to be documented and preserved with utmost care.

All the bronze sculptures should be registered under the AMSR Act and kept in safe custody inside the temples, with appropriate security arrangements or in the nearest icon centre.

3.3.3 Preservation of Inscriptions

Tamil Nadu has some of the most historically signiicant inscriptions starting form as early as 3rd century B.C. These inscriptions are in vairious scripts. The Tamil Brahmi

script was prevalent in inscriptions from 3rd century BCE onwards. the practice of writing Sanskrit letters in Tamil Nadu, commonly known as Grantha script was popularised by the Pallavas. This continued for nearly two centuries i.e. from 4th – 6th century. The Tamil script evolved from the Grantha script around 7th century CE.Inscriptions in the Tamil script are found from the beginning of the seventh century CE. Inscriptions in this script are found only in the northern portion of Tamil Nadu upto the beginning of the eleventh century CE. In the extreme south i.e. the Pandya country, Vattezhuthu was in use. But with the occupation of the Pandya country by the Cholas after conquest in the closing years of the tenth century CE the Tamil script came to be used there also. Thereafter, it has been in use throughout Tamil Nadu.

The importance of the inscriptions lies in the fact that they generally offer information about personages and events in history, about which nothing is known from any other source. They are a testament to the way of life of the historic society.

Inscriptions are found in the temple structures in the following places:

- the outer walls of the central shrine, the garba griha and the artha mandapam.
- Pillars of the Artha Mandapam
- walls of the maha-mandapa
- utsava mandapas such as the thousand pillared hallis in large temple complexes
- prakara walls
- walls of the smaller shrines
- near ancient wells and water bodies
- Bali peetha and dwajasthabam
- under the sculptures in the vimana
- on the artifacts such as temple bells, and copper plates.

3.3.3.5 Maintenance protocols for Inscriptions

Documentation

A thorough documentation of all the inscriptions in temple structures are to be made. Listing of inscriptions in good condition and inscriptions in a state of deterioration and needing immediate attention must be done. This list and documentation through high resolution photography and videos must be made available with the department as well as the respective temple offices.

Identification of new inscriptions must be notified to the State Archeology Department and necessary steps must be taken for its preservation.

Dismantling and re-assembly of structures

The temple structures must be preserved in its original state as it appears at the time of conservation. If in any case certain structures beyond scope got structural conservation are dismantled and reassembled, care should be taken that this process does not affect the inscriptions on the surfaces of the structural members. Numbering the structural members, their transportation and storage must be done under expert supervision.

During Conservation work

Conservation practices such as addition of structural metal ties, repointing etc must not affect the inscriptions on the surface. The surfaces must be adequately protected during any conservation work so as to prevent the settlement of dust, sand, lime, etc over the inscriptions.

Re-engraving of the inscriptions during the conservation process is strictly condemned, as it is against the principles of conservation.

Threats due to the continuous use of the temples

Vandalism by users such as writing on the temple walls must be strictly monitored. The settlement of oil, soot, religious offerings such as vibuthi, etc must be prevented, and periodic cleaning of the surfaces using safe methods must be practiced.

Addition of modern services

Care must be taken during the addition of services such as plumbing and electrical lines so that it does not affect the surfaces with inscriptions.

Creating Awareness

All the stake holders, including the general public must be sensitized to the value of historic inscriptions and it is the duty of all the users of the temple to protect and safeguard this invaluable cultural heritage.

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source: Dr. R. Kannan, Manual for Conservation and Restoration of Monuments, Proceedings Of Administor Turned Conservation Archeologist And Museologist, Published by the
Government Museum, Chennai: 2007

[i] Centre for Cultural Resources and Training, http://ccrtindia.gov.in/